

ORDER NO. ARP 1716

COMPACT DISC PLAYER

# PD-X550

#### MODEL PD-X550 HAS TWO VERSIONS:

| Type Power requirement |                             | Export destination |
|------------------------|-----------------------------|--------------------|
| HEM                    | AC220V, 240V (Switchable) * | European continent |
| НВ                     | AC220V, 240V (Switchable) * | United Kingdom     |

<sup>\*</sup> Change the connection wire from Power switch board assembly to Transformer board assembly.

- This manual is applicable to the HEM and HB types.
- For the HB type, refer to page 71.
- Ce manuel pour le service comprend les explications en français de réglage.
- Este manual de servicio trata del método ajuste escrito en español.

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24TH

# 1. SAFETY INFORMATION

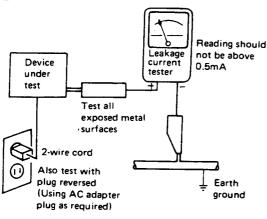
# -(FOR USA MODEL ONLY)-

#### 1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

#### LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUT-LINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

# 2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a  $\triangle$  on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

#### r(FOR EUROPEAN MODEL ONLY)-

**CVAROITUS!** —

LAITE SISALTAA LASERDIODIN, JOKA LÄHETTÄÄ NÄKYMÄTÖNTÄ, SILMILLE VAARALLISTA INFRAPUNASÄTEILYÄ LAITTEEN SISALLA ON LASERDIODIN LÄHEISYYDESSÄ KUVAN 1. MUKAINEN VAROITUSMERKKI.



LASER Kuva 1 Lasersateilyn varoitusmerkki

rWARNING!-

DEVICE INCLUDES LASER DIODE WHICH EMITS INVISIBLE INFRARED RADIA-TION WHICH IS DANGEROUS TO EYES. THERE IS A WARNING SIGN ACCORDING TO PICTURE 1 INSIDE THE DEVICE CLOSE TO THE LASER DIODE.



LASER Picture 1 Warning sign for laser radiation

FADVERSEL:-

USYNLIG LASERSTRÄLING VED ÅBNING NAR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION UNDGA UDSAETTELSE FOR STRALING.

- VIKTIGT -

APARATEN INNEHÅLLER LASER AV HÖGRE KLASS ÄN 1. INGREPP I APPARATEN BÖR GÖRAS AV SPECIELLT UTBILDAD PERSONAL.

Bonnet

Front panel

- IMPORTANT

THIS PIONEER APPARATUS CONTAINS LASER OF HIGHER CLASS THAN 1. SERVICING OPERATION OF THE APPARATUS SHOULD BE DONE BY A SPECIALLY INSTRUCTED PERSON.

#### LABEL CHECK

CAUTION

INVISIBLE LASER RADIATION WHEN OPEN, AVOID EXPOSURE TO BEAM PRW1018

HB model



CAUTION

LASER RADIATION WHEN OPEN, AVOID EXPOSURE TO BEAM ADVARSEL

FARE FOR USYNIG LASERSTRÂLING, VOR BENNIG AF DÆKSEL, UNDGÅ AT UDSÆTTE ØJNENE FOR STRÅLING.

VORSICHT!

UNSICHTBARE LASER STRAHLUNG TRITT AUS, WENN DECKEL IODER KLAPPEI GEOFFNET IST! MCHT DEM STRAH, AUSSETZEN!

PRW-175



Additional Laser Caution

1. Laser Interlock Mechanism

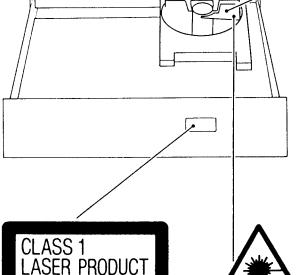
The ON/OFF status of the clamp switch (S102) for detecting loading completion is detected by the system microprocessor, and the design prevents laser diode oscillation when the clamp switch is OFF.

Thus, the interlock will no longer function if the clamp switch (S102) is deliverately shorted.

In the test mode the interlock mechanism will not function (refer to page 29).

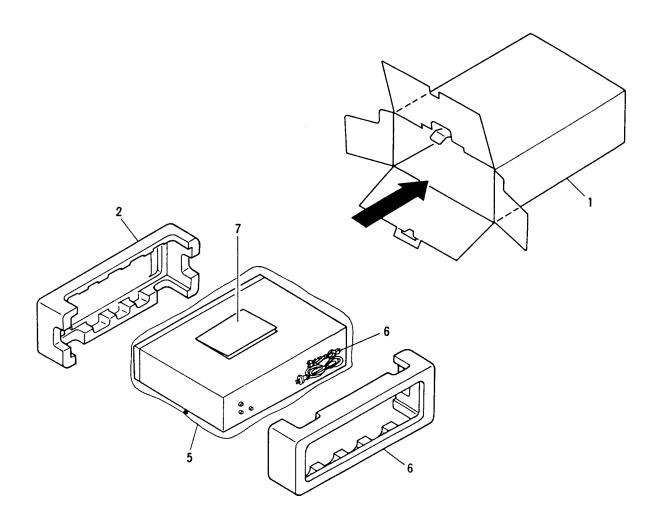
Laser diode oscillation will continue if pin 4, 5, or 29 of CXA1081S (ICI) is connected to ground or the terminals of Q1 are shorted to each other (fault condition).

2. If the fault condition described in 1 is induced with the cover removed and the objective lens extending past the outer circumference of the disc clamper diameter, close viewing of the objective lens with the naked eye will cause exposure to a Class 1 or higher laser beam.



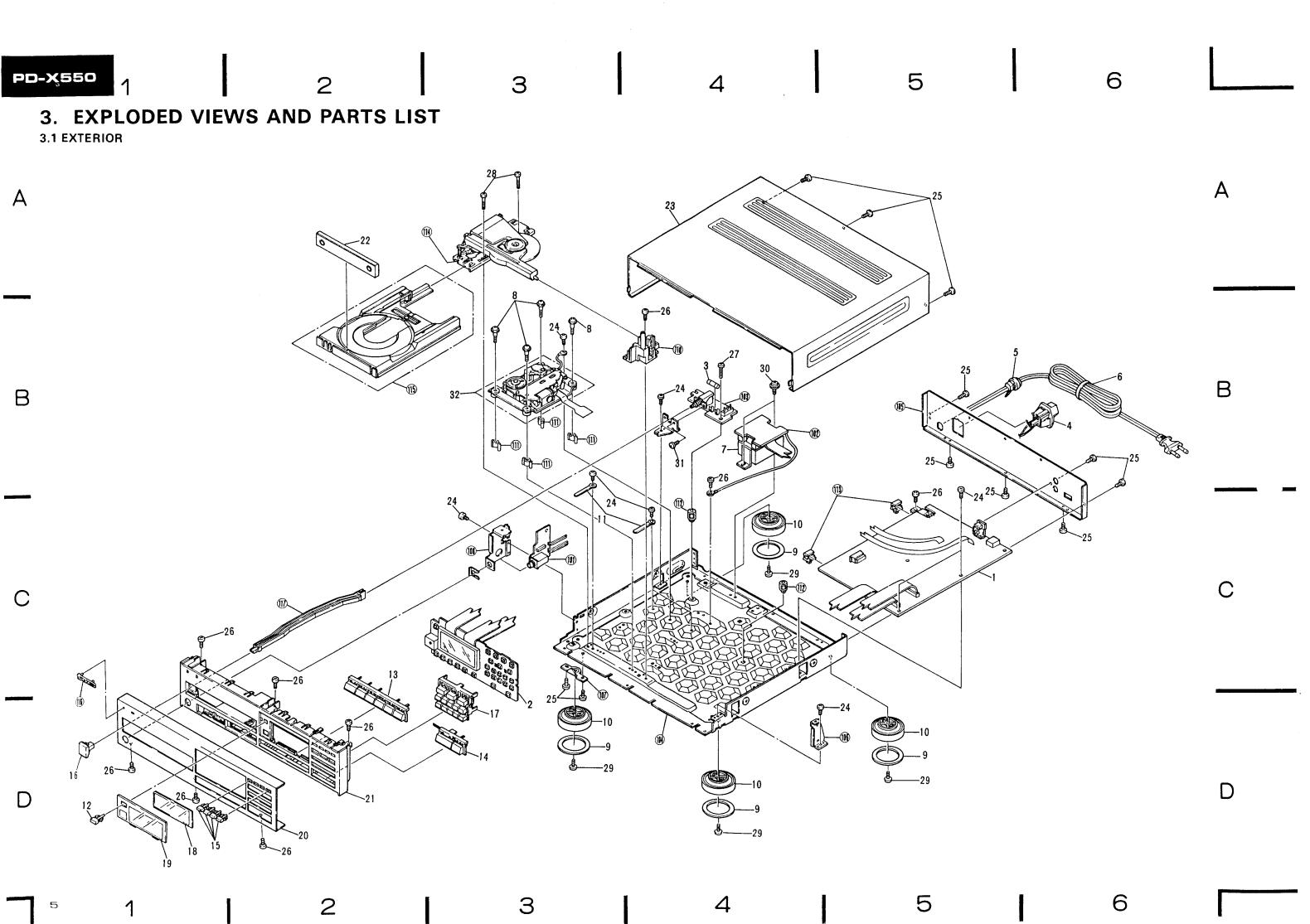
**HEM and HB models** 

# 2. PACKING



#### Parts List of Packing

| Mark      | No. | Part No. | Description               |
|-----------|-----|----------|---------------------------|
|           | 1   | PHG1321  | CD packing case           |
|           | 2   | PHA1070  | Protector (F)             |
|           | 3   | PHA1071  | Protector (R)             |
| 4 PHC1030 |     | PHC1030  | Spacer (with in the tray) |
|           | 5   | Z23-022  | Mirror mat sheet          |
|           | 6   | PDE1023  | Connection cord with pin  |
|           |     |          | plug                      |
|           | 7   | PRE1094  | Instruction manual        |



#### NOTES:

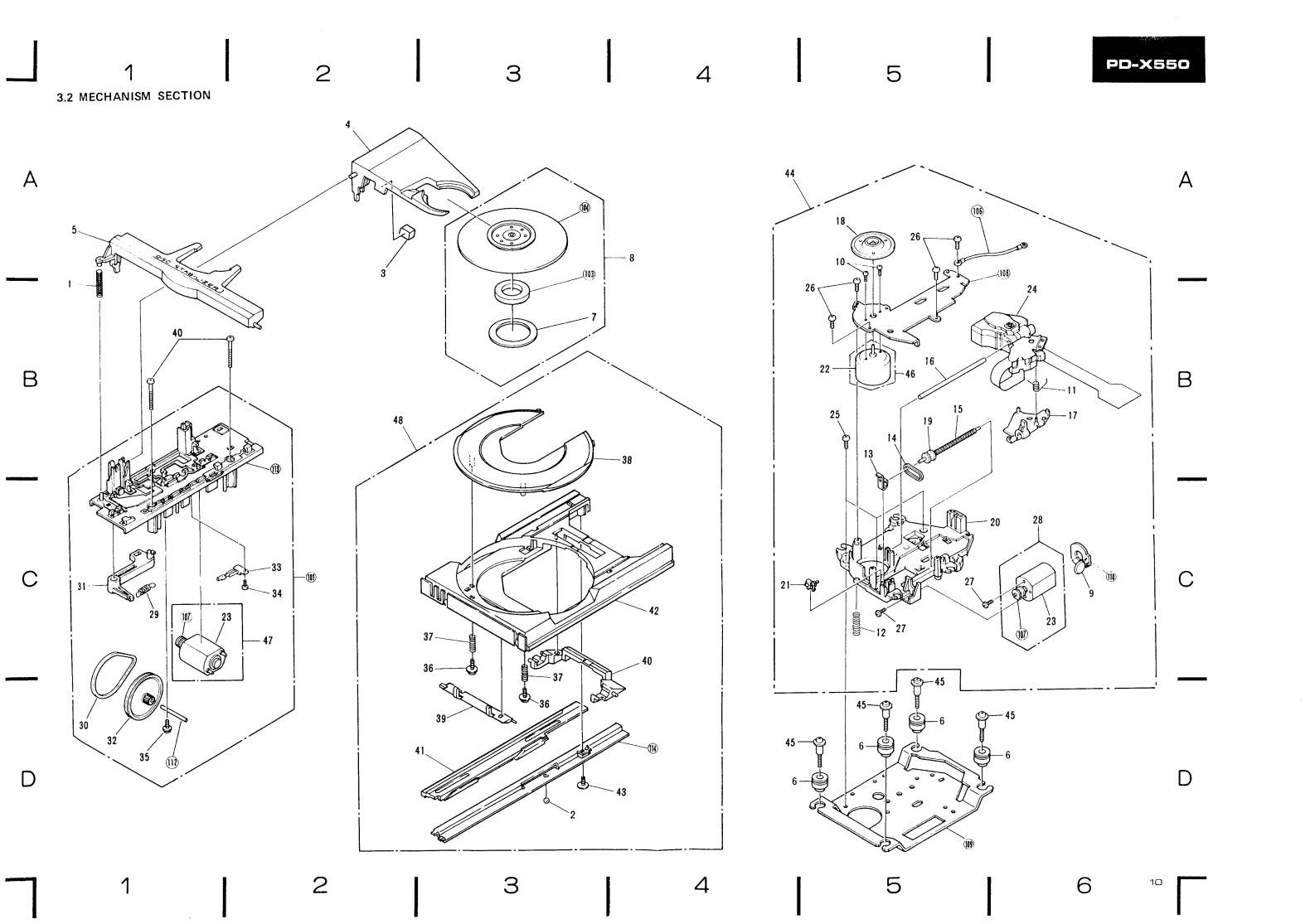
- NOTES:
  Parts without part number cannot be supplied.
  The ∆ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
  Parts marked by "®" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

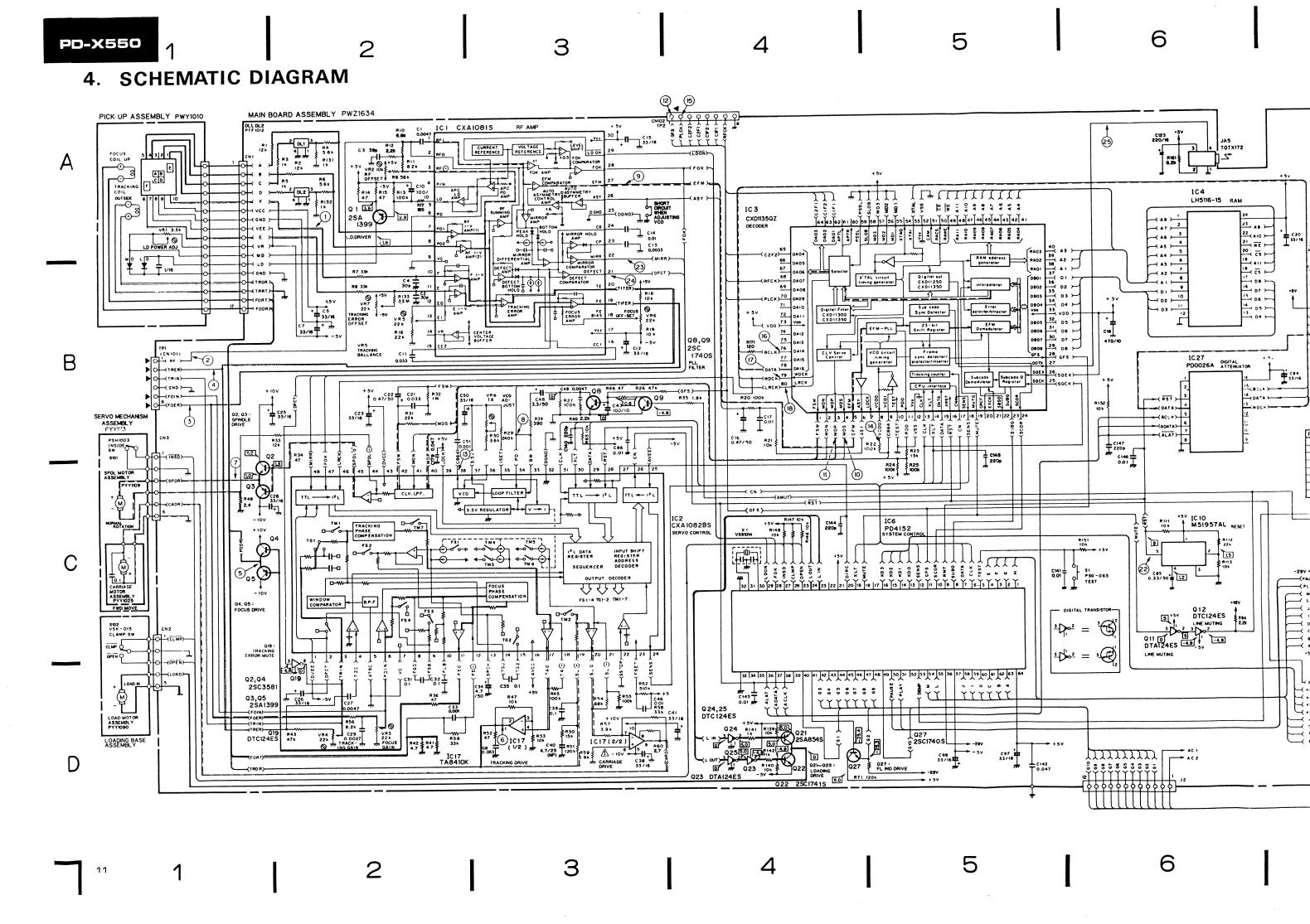
# Parts List of Exterior

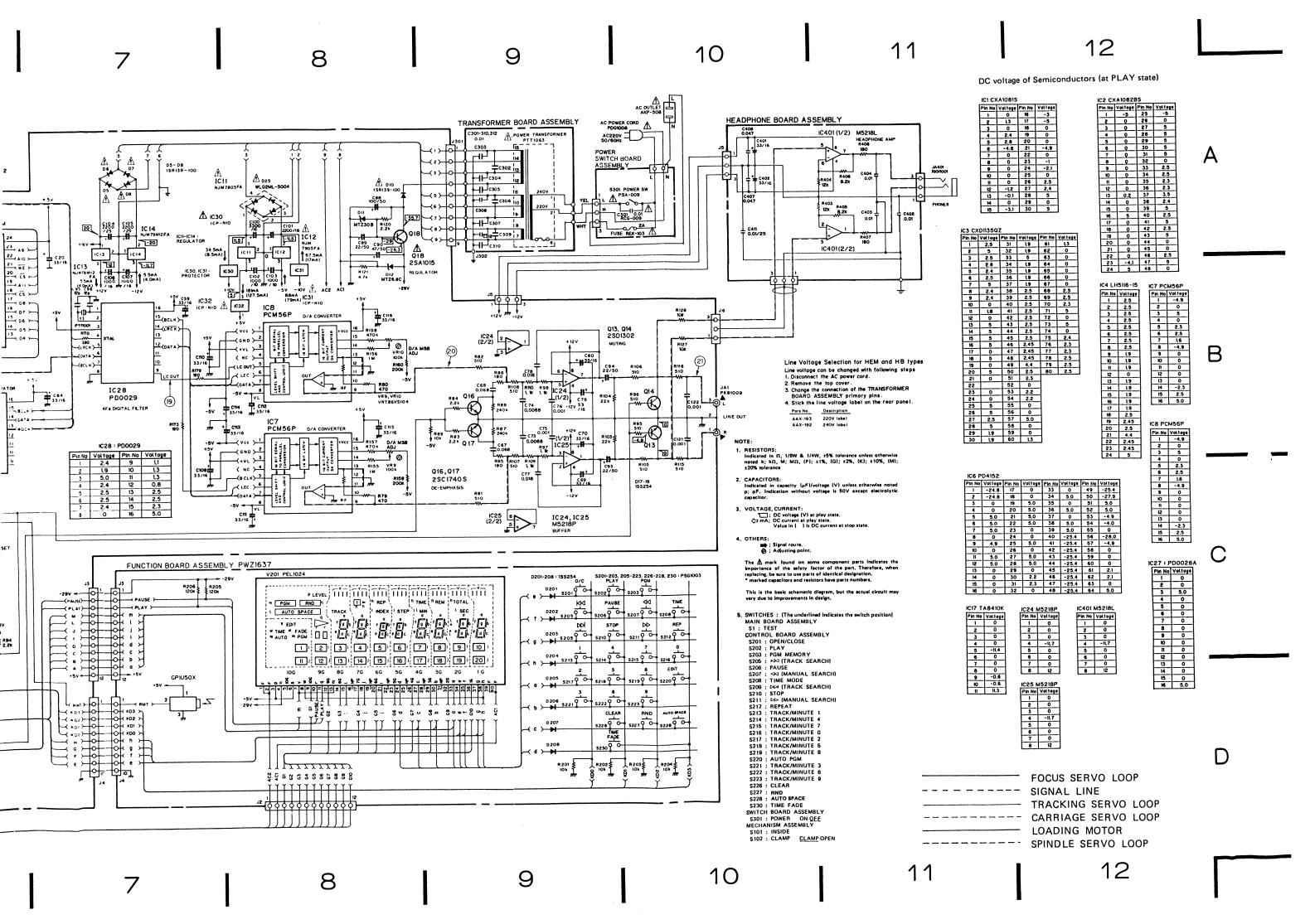
| Mark                            | No. | Part No.     | Description              | Mark | No. | Part No. | Description                 |
|---------------------------------|-----|--------------|--------------------------|------|-----|----------|-----------------------------|
| <u>A</u> •                      |     | PWZ1634      | Main board assembly      | -    | 101 |          | Headphone board assembly    |
| ⊙                               | 2   | PWZ 1637     | Function board assembly  |      | 102 |          | Transformer board assembly  |
| $\Lambda$                       | 3   | REK-103      | Fuse (2A)                |      | 103 |          | Power switch board assembly |
| $\overline{\Lambda}$            | 4   | AKP-508      | 1P AC outlet             |      | 104 |          | Under base                  |
| $\frac{\Lambda}{\Lambda}$       | 5   | CM-22B       | Strain relief            |      | 105 |          | Rear base                   |
| $\Lambda$                       | 6   | PDG1008      | AC power cord            |      | 106 |          | Angle                       |
| $\stackrel{f \Lambda}{\Lambda}$ | 7   | PTT1063      | Power transformer        |      | 107 |          | Foot stand                  |
|                                 |     |              | (AC220/240V)             |      | 108 |          | Angle L                     |
|                                 | 8   | PBA1001      | Screw                    |      | 109 |          | Switch angle                |
|                                 | 9   | PNM1070      | Stopper                  |      | 110 |          | Slide guide                 |
|                                 | 10  | PNW1263      | Insulator                |      | 111 |          | Mechanism support           |
|                                 | 11  | RNH-184      | Cord clamper             |      | 112 |          | PCB spacer                  |
|                                 | 12  | PAC1088      | Time button              |      | 113 |          | P. plate holder             |
|                                 | 13  | PAC1147      | Fuction button           |      | 114 |          | Loading base assembly       |
|                                 | 14  | PAC1148      | P/S button               |      | 115 |          | Tray assembly               |
|                                 | 15  | PAC1169      | Fade button              |      | 116 |          | Name plate                  |
|                                 | 16  | PAC1170      | Power button             |      | 117 |          | Power SW joint              |
|                                 | 17  | PAC1273      | Mode button              |      |     |          |                             |
|                                 | 18  | PAM1113      | FL filter                |      |     |          |                             |
|                                 | 19  | PAM1289      | Acrylic window           |      |     |          |                             |
|                                 | 20  | PAN1128      | Front panel              |      |     |          |                             |
|                                 | 21  | PNW1180      | Function panel           |      |     |          |                             |
|                                 | 22  | PNW1523      | Plate                    |      |     |          |                             |
|                                 | 23  | PYY1054      | Bonnet                   |      |     |          |                             |
|                                 | 24  | BBZ30P060FMC | Screw                    |      |     |          |                             |
|                                 | 25  | BBZ30P080FCC | Screw                    |      |     |          |                             |
|                                 | 26  | BBZ30P080FZK | Screw                    |      |     |          |                             |
|                                 | 27  | BBZ30P160FMC | Screw                    |      |     |          |                             |
|                                 | 28  | BBZ30P230FMC | Screw                    |      |     |          |                             |
|                                 | 29  | IBZ30P120FCC | Screw                    |      |     |          |                             |
|                                 | 30  | 1BZ40P080FCC | Screw                    |      |     |          |                             |
|                                 | 31  | PMZ30P060FCU | Screw                    |      |     |          |                             |
|                                 | 32  | PYY1113      | Servo mechanism assembly |      |     |          |                             |

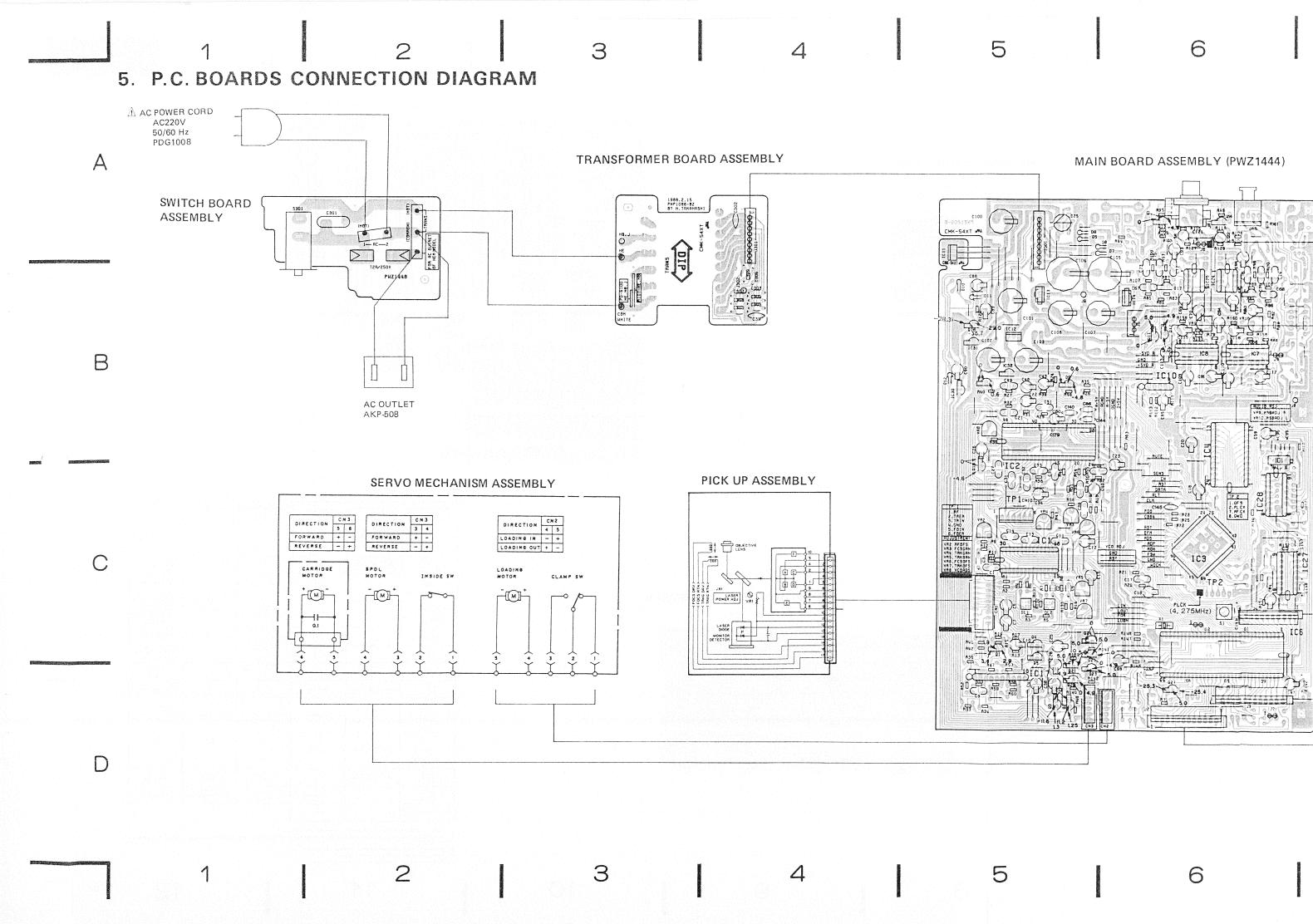
# Parts List of Mechanism Section

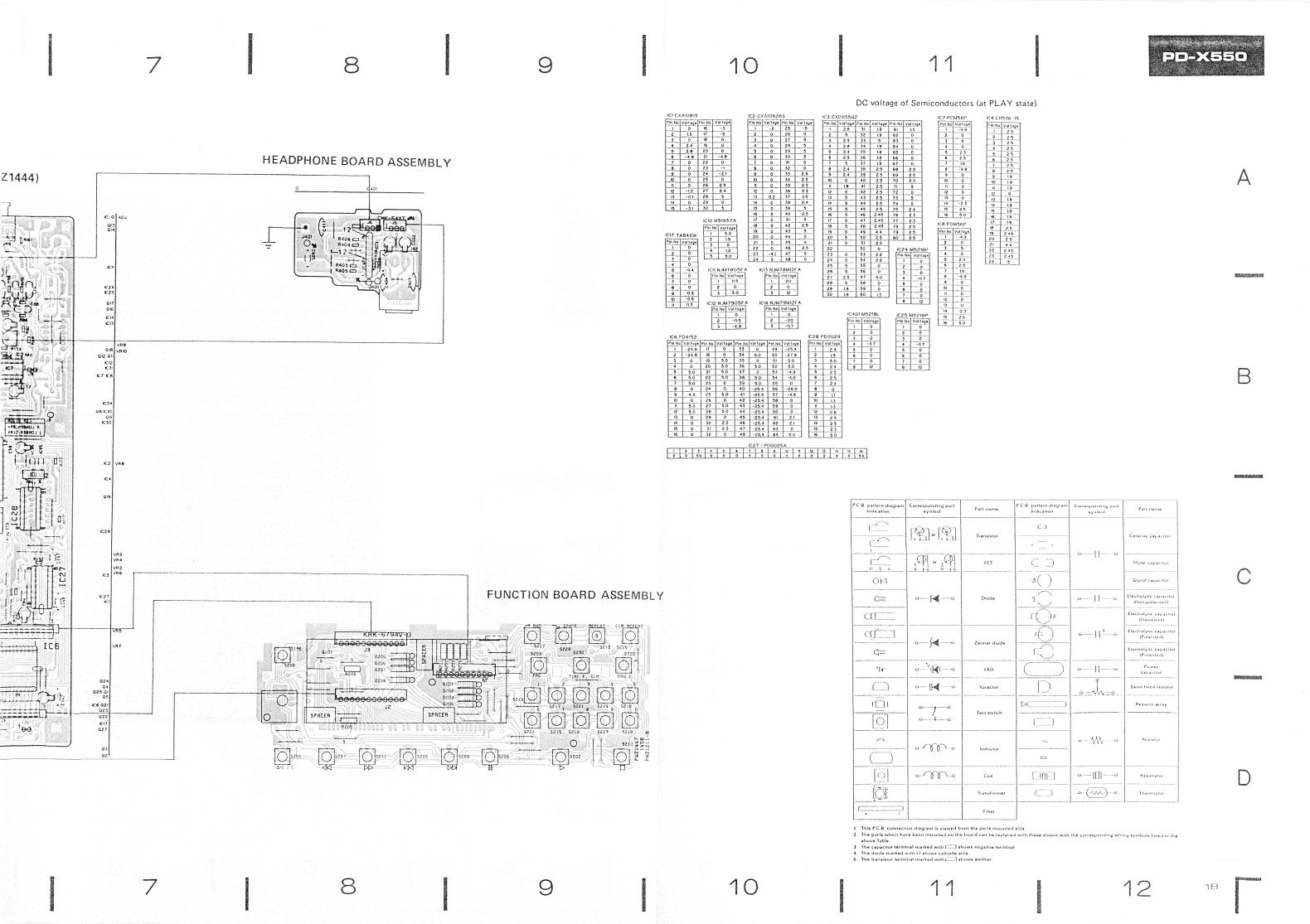
| Mark | No. | Part No.     | Description            | Mark    | No. | Part No.     | Description               |
|------|-----|--------------|------------------------|---------|-----|--------------|---------------------------|
|      | 1   | PBH1013      | Spring                 | <u></u> | 34  | BPZ20P080FZK | Screw                     |
|      | 2   | PBP-001      | Steel ball $\phi 4$    |         | 35  | IPZ30P060FMC | Screw                     |
|      | 3   | PEB1032      | Stopper rubber         |         | 36  | PBA1025      | Screw                     |
|      | 4   | PNW1084      | Clamp holder           |         | 37  | PBH1045      | Plate spring              |
|      | 5   | PNW1085      | Clamp retainer         |         | 38  | PNW1329      | Disc plate                |
|      | 6   | PEB1031      | Floating rubber        |         | 39  | PNW1330      | Plate lever (F)           |
|      | 7   | PNM1010      | Disc cushion           |         | 40  | PNW1331      | Plate lever (R)           |
|      | 8   | PYY1084      | Clamper assembly       |         | 41  | PNW1332      | Rack                      |
|      | 9   | CGDYX104M25  | Semiconductive ceramic |         | 42  | PNW1390      | Tray                      |
|      |     |              | capacitor              |         | 43  | PPZ30P080FMC | Screw                     |
|      | 10  | PBA1037      | Screw M2 x 2.5         |         | 44  | PYY1113      | Servo mechanism assembly  |
|      | 11  | PBH1008      | Drive spring           |         | 45  | PBA1001      | Screw                     |
|      | 12  | PBH1009      | Earth spring           |         | 46  | PYY1109      | Motor assembly (with oil) |
|      | 13  | PBK1057      | Plate spring           |         | 47  | PYY1090      | Motor assembly (LOADING   |
|      | 14  | PEB1072      | Belt (CARRIAGE)        |         | 48  | PYY1065      | Tray assembly             |
|      | 15  | PLA1003      | Drive worm             |         | 101 |              | Loading base assembly     |
|      | 16  | PLA1004      | Guide bar              |         | 102 |              | • • • • •                 |
|      | 17  | PNW1063      | Carriage plate         |         | 103 |              | Magnet                    |
|      | 18  | PNW1064      | Disc table             |         | 104 |              | Clamper                   |
|      | 19  | PNW1066      | Pulley                 |         | 105 |              | Connector assembly (6P)   |
|      | 20  | PNW1520      | Mechanism chassis      |         | 106 |              | Earth lead unit           |
|      | 21  | PSH1003      | Slide switch           |         | 107 |              | Motor pulley              |
|      | 22  | PXM1001      | Spindle motor          |         | 108 |              | Base plate                |
|      | 23  | PXM1002      | Motor (CARRIAGE,       |         | 109 |              | Ballast base              |
|      |     |              | LOADING)               |         | 110 |              | Carriage M board          |
|      | 24  | PWY1010      | Pick up assembly       |         | 111 |              | Connector assembly (5P)   |
|      | 25  | BBZ30P080FCC | Screw                  |         | 112 |              | Gear shaft                |
|      | 26  | PBZ20P080FZK | Screw                  |         | 113 |              | Loading base              |
|      | 27  | PMZ20P030FMC | Screw                  |         | 114 |              | Slide base                |
|      | 28  | PYY1025      | Motor assembly         |         |     |              |                           |
|      |     |              | (CARRIAGE)             |         |     |              |                           |
|      | 29  | PBH1012      | Clamp spring           |         |     |              |                           |
|      | 30  | PEB1013      | Belt (LOADING)         |         |     |              |                           |
|      | 31  | PNW1083      | Ctamp lever            |         |     |              |                           |
|      | 32  | PNW1171      | Gear pulley            |         |     |              |                           |
|      | 33  | VSK-015      | Leaf switch            |         |     |              |                           |

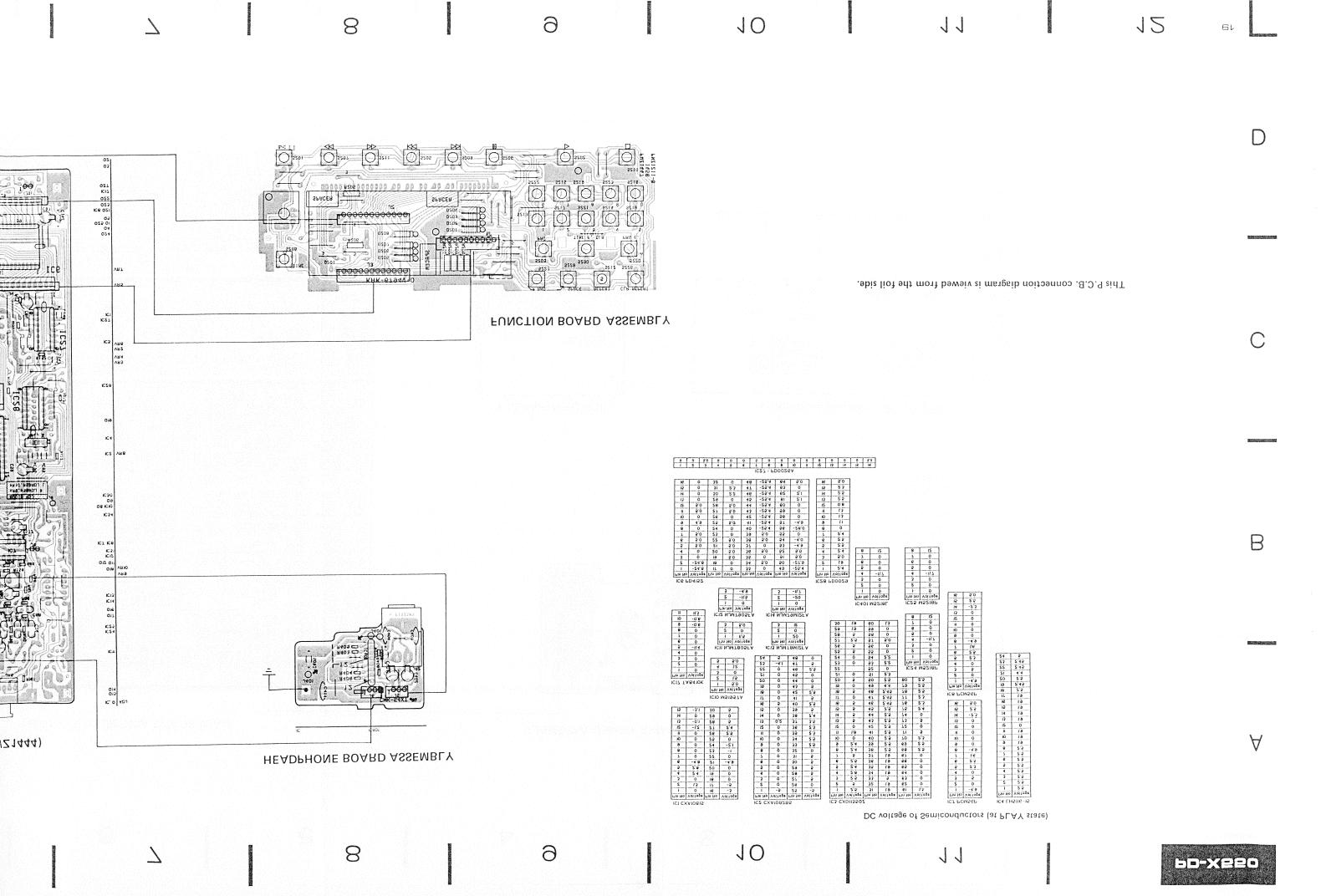


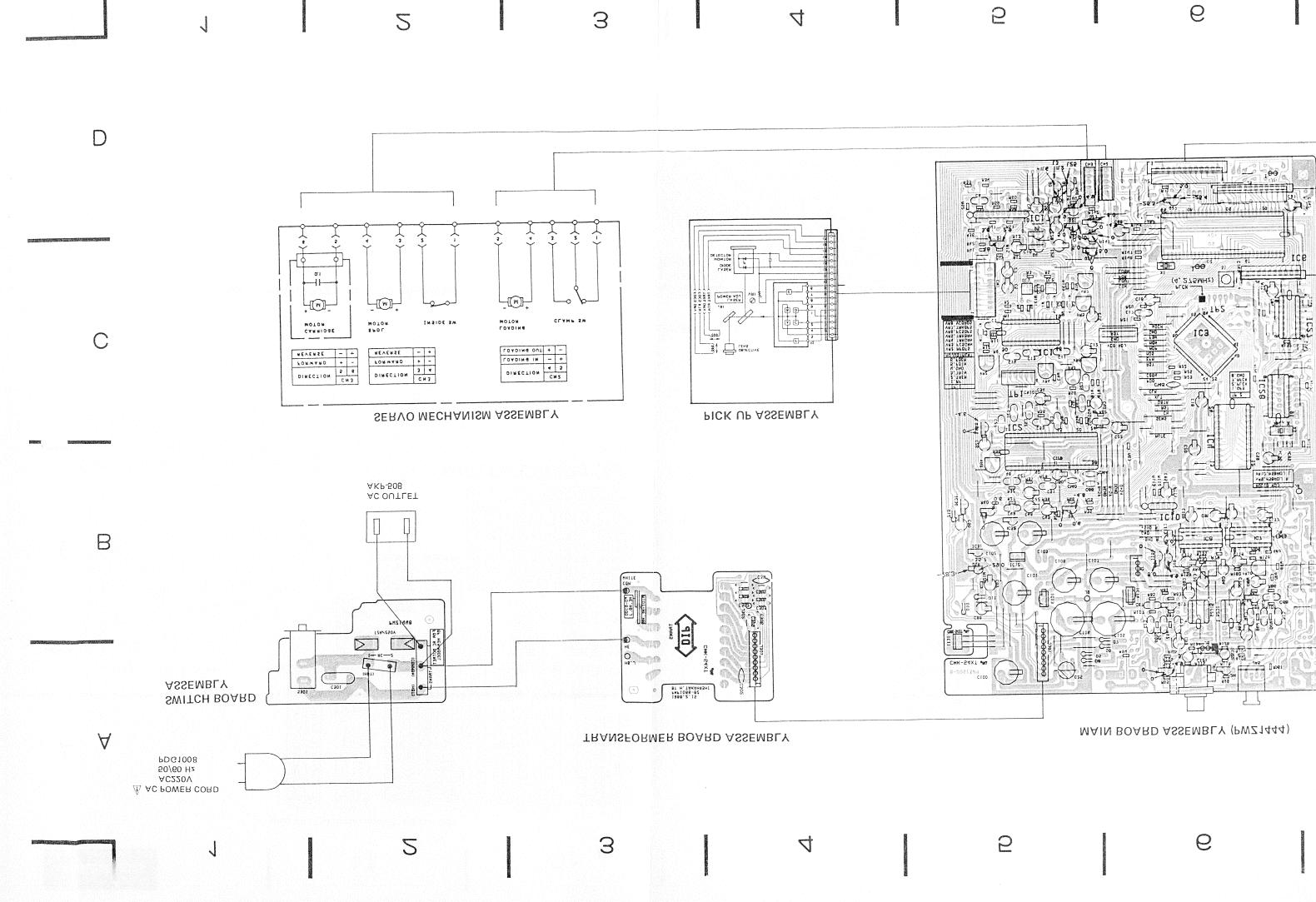


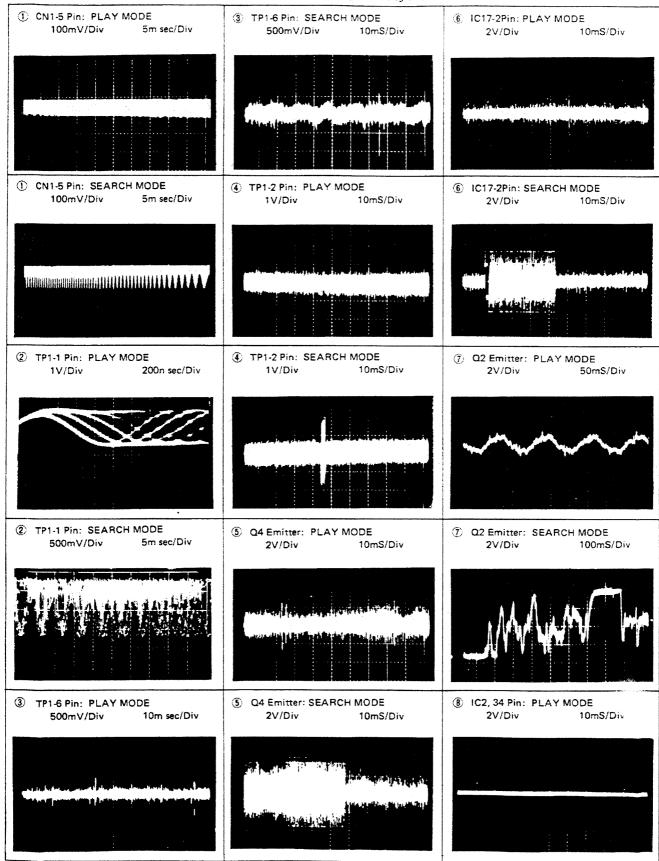


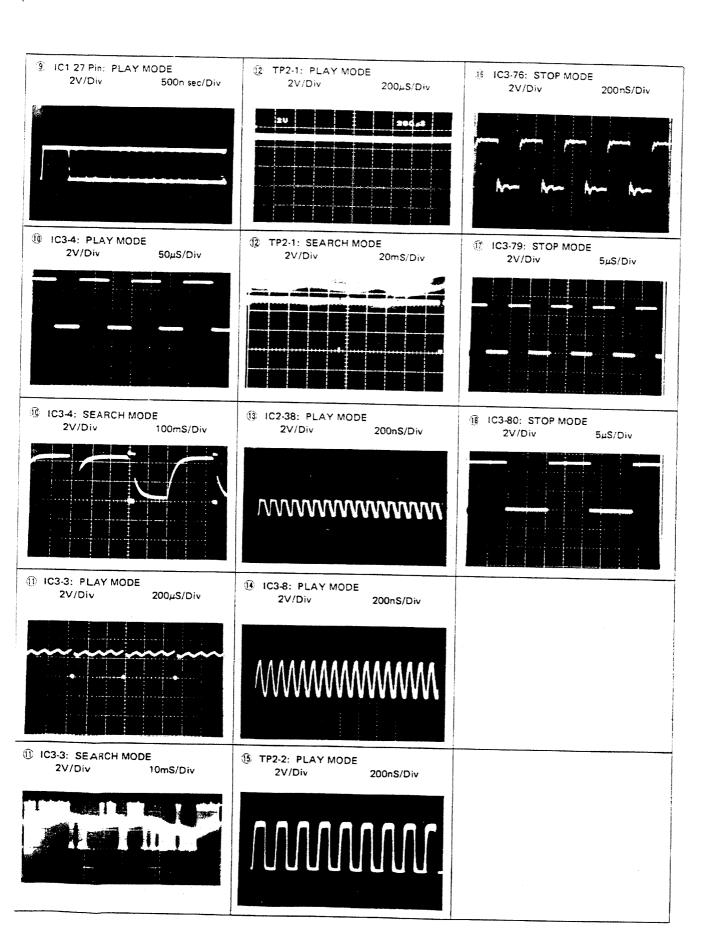


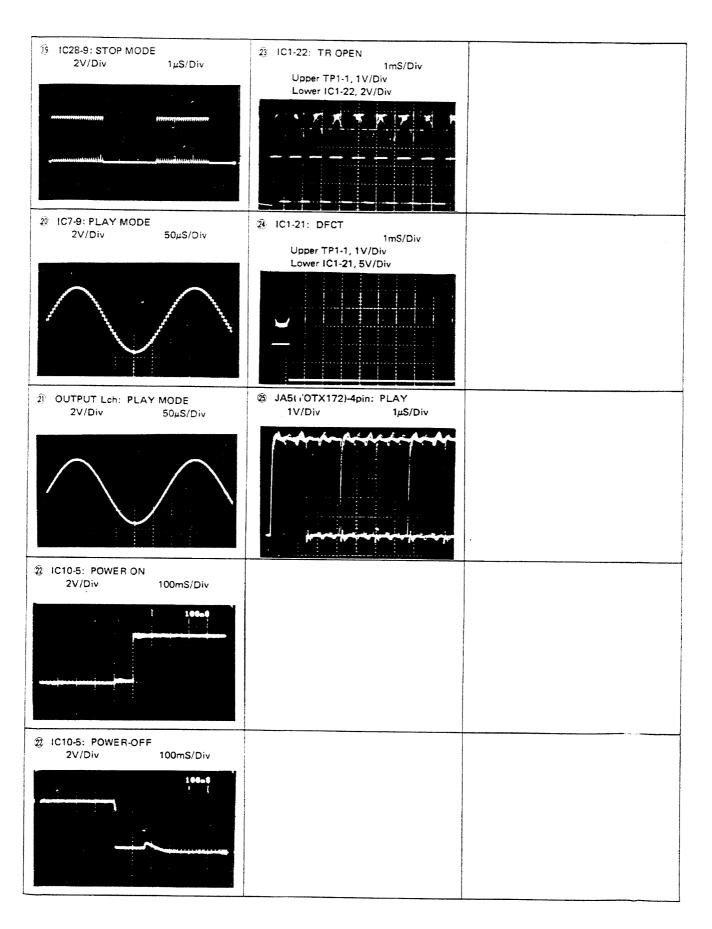












# 6. ELECTRICAL PARTS LIST

# NOTES:

- Parts without part number cannot be supplied.
- Parts marked by "®" are not always kept in stock. Their delivery time may be longer than usual or they may be unavail-
- The A mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when
- This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc. When ordering resistors, first convert resistance values into code form as shown in the following examples.
- Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J =560Ω  $56 \times 10^{1}$

561......RD1/4PS 55 66 日 J  $47k\Omega$  $47 \times 10^{3}$ 473.....RD1/4PS 🗓 🗇 🗗 🗗 0R5......RN2H © ® ॼ K  $0.5\Omega$  $I\Omega$ 

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors). 562×10<sup>1</sup> 5621......RNI/4SR ⑤ ⑥ ② ① F

# Miscellaneous Parts

# P.C. BOARD ASSEMBLY

| Mark | Symbol & Description   | Part No. |
|------|--|----------|
| Æ ⊙  | Main board assembly<br>Headphone board assembly                                      | PWZ1634  |
| •    | Transformer board assembly<br>Function board assembly<br>Power switch board assembly | PWZ1637  |

#### **OTHERS**

| Mark                             | Symbol & | Description                          | Part No.    |
|----------------------------------|----------|--------------------------------------|-------------|
| <u>A</u><br><u>A</u><br><u>A</u> |          | 1P AC outlet                         | AKP-508     |
| <u> </u>                         |          | Strain relief                        | CM-22B      |
| <u>4</u>                         |          | AC power cord                        | PDG1008     |
| <u>w</u>                         |          | Power transformer (AC 220/240V) .    | PTT1063     |
| Ĺ                                |          | Fuse (2A)                            | REK-103     |
|                                  |          | Spindle motor                        | PXM1001     |
|                                  |          | Spindle motor assembly<br>(with oil) | PYY1109     |
|                                  |          | Motor                                | PXM1002     |
|                                  |          | Motor assembly                       | PYY1025     |
|                                  |          | (CARRIAGE, LOADING                   | 3)          |
|                                  | \$101    | Slide switch (INSIDE)                | PSH1003     |
|                                  | S102     | Leaf switch (OPEN/CLAMP)             | VSK-015     |
|                                  |          | Pick-up assembly                     | PWY1010     |
|                                  |          | Servo mechanism assembly             | PYY1113     |
|                                  |          | Semiconductive ceramic capacitor     | CGDYX104M25 |

# **SEMICONDUCTORS**

| Mark     | Symbol & Description  | Part No.    |
|----------|-----------------------|-------------|
|          | IC1                   | CXA1081S    |
|          | IC2                   | CXA1082BS   |
|          | 1C3                   | CXD1135QZ   |
| Δ        | IC30-IC32             | ICP-N10     |
|          | IC4                   | LH5116-15   |
|          | IC10                  | METOETA     |
|          | IC24, IC25            | M51957AL    |
| ٨        | IC13                  | M5218P      |
| Δ        | IC11                  | NJM78M12FA  |
|          | IC14                  | NJM7805FA   |
| Δ        |                       | NJM79M12FA  |
| Æ        | IC12<br>IC7, IC8      | NJM7905FA   |
|          | IC27                  | PCM56P      |
|          | IC28                  | PD0026A     |
|          | IC6                   | PD0029      |
|          | 100                   | PD4152      |
| <u> </u> | IC17                  | TA8410K     |
|          | Q11, Q23              | DTA124ES    |
| Δ        | Q12, Q19, Q24, Q25    | DTC124ES    |
| Ĺ        | Q18                   | 2SA1015     |
|          | Q1, Q3, Q5            | 2SA1399     |
|          | Q21                   | 2SA854S     |
|          | Q8, Q9, Q16, Q17, Q27 | 20047400    |
|          | Q22                   | 2SC1740S    |
|          | Q2, Q4                | 2SC1741S    |
|          | Q13, Q14              | 2SC3581     |
|          |                       | 2SD1302     |
|          | D11                   | MTZ30B      |
|          | D12                   | MTZ6.8C     |
|          | D25                   | WL02ML-5004 |
|          | D5-D8, D10            |             |
|          |                       | 1SR139-100  |

| CI | 111 | T | ^ | . 3 |
|----|-----|---|---|-----|
| SV | ¥.  |   | U | п   |

| VRTB6VS103<br>VRTB6VS104<br>VRTB6VS223<br>VRTS6VS102 |
|--|
|  |
| DN4 (CDCCCC  |
| RN1/6PQ3601F<br>RD1/6PMDDDD                          |
|  |
|  |
|  |
| Part No.   |
|  |
| PSS1001  |
| VSS1014  |
|  |
| PTF1012  |
|  |
| PKB1009  |
| TOTX172  |
|  |
|  |
|  |
|  |
|  |
| On the All I   |
| Part No.   |
| M5218L<br>◆  |
|  |
| Part No.   |
|  |
| CEAS330M16   |
| CGDYF473Z25  |
| CKCYF103Z50  |
| CKPUYF103Z2  |
|  |
|  |
| B 11   |
| Part No.   |
| RD1/6PM□□□J  |
|  |
|  |
|  |
|  |
| Part No.   |
| PKN1001  |
|  |
|  |
|  |

RESISTORS

# Power Switch Board Assembly

#### SWITCH

| Mark | Symbol & Do | escription   | Part No. |
|------|-------------|--------------|----------|
| Æ    | S301        | Power switch | PSA-009  |

#### CAPACITOR

| Mark | Symbol & Description | Part No. |
|------|----------------------|----------|
|      |                      |          |
| ΔĹ   | C301                 | RCG-009  |

# **⊙** Function Board Assembly (PWZ1637)

# **SEMICONDUCTORS**

| ř | Vlark | Symbol & Description | Part No. |
|---|-------|----------------------|----------|
| _ |       | D201-D208            | 1\$\$254 |

#### SWITCHES

| Mark | Symbol & Description      | Part No. |  |  |
|------|---------------------------|----------|--|--|
|      | \$201-\$203, \$205-\$223, | PSG1003  |  |  |
|      | \$226-\$228, \$230        |          |  |  |
|      | Tack switch               |          |  |  |

# RESISTORS

| Mark | Symbol & Description | Part No.    |
|------|----------------------|-------------|
|      |                      |             |
|      | R201—R206            | RD1/4PM□□□J |

#### **OTHERS**

| Mark | Symbol 8 | <b>Description</b>         | Part No. |  |
|------|----------|----------------------------|----------|--|
|      | V201     | Fluorescent indicator tube | PEL1024  |  |
|      |          | Remote control sensor unit | GP1U50X  |  |

# Transformer Board Assembly

# CAPACITORS

| Mark | Symbol & Description | Part No.    |
|------|----------------------|-------------|
|      | C302-C311            | CKCYF103Z50 |



# 7. ADJUSTMENTS

The adjustments for this unit are shown below. Adjustments must be made in the order in which they are listed.

#### ADJUSTMENTS

- 1. Tracking error offset, focus offset and RF offset adjustment
  - 2. RF level adjustment
  - 3. LD (laser diode) power check
  - 4. Focus lock and spindle lock check
  - 5. Grating adjustment (1), (2)
  - 6. Tracking balance adjustment
  - 7. Tangential adjustment
  - 8. Focus gain adjustment
  - 9. Tracking gain adjustment
  - 10. VCO free run frequency adjustment
  - 11. Focus error check
  - 12. MSB adjustment

#### REQUIRED EQUIPMENT

- 1. Dual trace oscilloscope
- 2. Optical power meter
- 3. Test disc (YEDS-7)
- 4. Loop gain adjustment lifter
- 5. Signal generator
- 6. Frequency counter
- 7. Other commonly used measuring equipment

#### ABOUT THE TEST MODE

#### - Activating and releasing the test mode -

- (1) To activate the test mode, turn ON the power switch (S301) with the test mode switch (S1) in the ON position.
- (2) The test mode is released by turning the power switch OFF.

The functions for the keys in the test mode are outlined in Table 7-1.

#### ADJUSTMENT VRs AND THEIR NAMES

VR1: Laser power

VR2: RF offset (RF.OFS)

VR3: Focus gain (VCS.GAN)

VR4: Tracking gain (TRK.GAN)

VR5: Tracking balance (TRK.BAL)

VR6: Focus offset (VCS.OFS)

VR7: Tracking offset (TRK.OFS)

VR8: VCO adjust (VCO.ADJ)

VR9: MSB adjust R-CH (MSB.ADJ-R)

VR10: MSB adjust L-CH (MSB.ADJ-L)

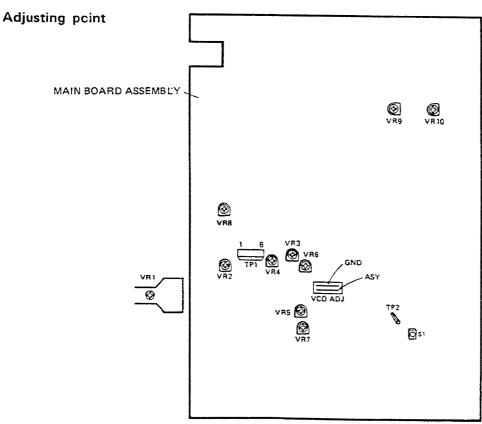


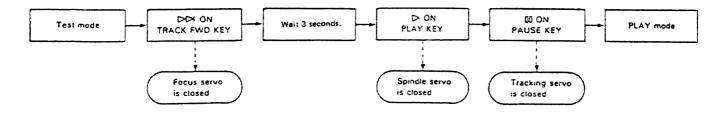
Fig. 7-1

#### PD-X550

In the test mode, the servos must be closed and opened individually. Consequently servos must each be closed in the proper sequence (serial sequence) in order to put the machine into the play mode. Note also that during test mode the unit will not enter the play mode when the PAUSE (101) key is pressed alone.

For example, in order to change from the stop to the play mode, the function keys must be pressed in the following order.

\* In the test mode, the servos must be operated in serial sequence.

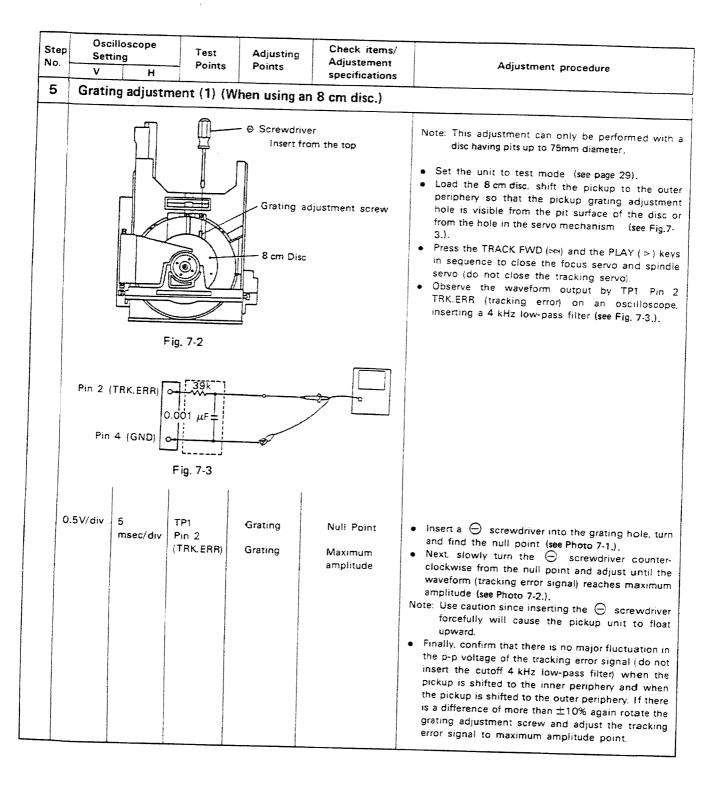


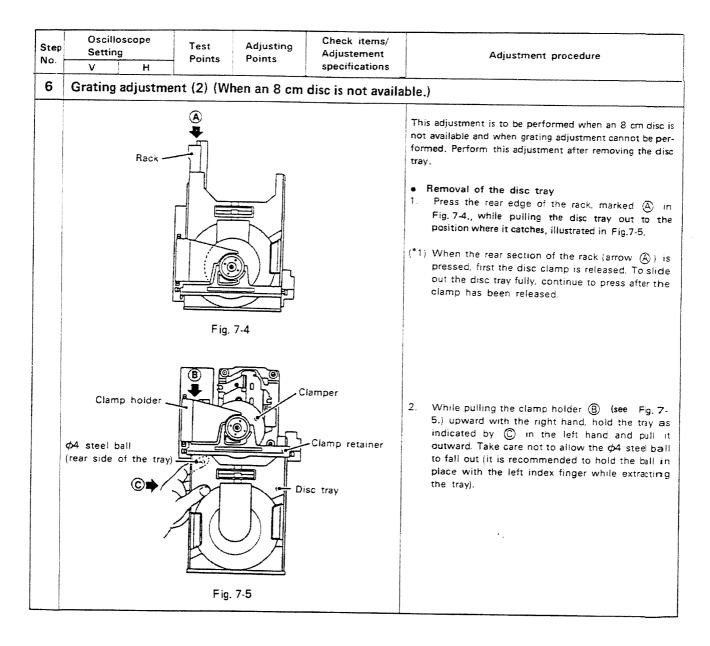
#### KEY FUNCTIONS IN THE TEST MODE

| Symbol   | Key name          | Function in test mode            | Description  |
|----------|-------------------|----------------------------------|--|
| XX       | TRACK FWD         | Focus servo close                | Turns ON the laser diode, and raises and lowers the focusing actuator to close the focus servo,  |
| Δ        | PLAY              | Spindle servo close              | Closes the servo in the CLV-A mode after kicking the spindle motor.  |
| 00       | PAUSE             | Tracking servo close/open        | Acts as toggle: closes the tracking servo and activates play mode when pressed (provided the focus and spindle servos are closed), at which time the PAUSE indicator illuminates; opens the tracking servo when pressed again. |
| 8        | MANUAL SEARCH REV | Carriage reverse (moves inward)  | Moves carriage quickly (3 cm/s) toward inner-most track. Be careful not to move too far as there is no safety device to stop the carriage.   |
| <b>D</b> | MANUAL SEARCH FWD | Carriage forward (moves outward) | Moves carriage quickly (3 cm/s) toward outer-most track. Be careful not to move too far as there is no safety device to stop the carriage.   |
|          | STOP              | Stop                             | Stops all servos and returns system to its initial state.  |
| Ê        | OPEN/CLOSE        | Disc tray open/close             | Opens and closes the disc tray. However, pickup does not return to rest on OPEN, and it remains stationary on CLOSE.   |

Table 7-1

| Step   | Oscillo<br>Setting | -                    | Test<br>Points   | Adjusting<br>Points   | Check items/<br>Adjustement   | Adjustment procedure  |
|--|--------------------|----------------------|--|---|---|---|
| No.  | V                  | Н                    |  |   | specifications  | •   |
| 1  | Trackin            | g error              | offset, f  | ocus offset   | and RF offset   | adjustment  |
|  |                    |                      | TP1 Pin 2 (TRK.ERR) TP1 Pin 6 (FCS.ERR) TP1 Pin 1 (RF. OUTPUT) | VR5<br>(TRK.BAL)<br>VR7<br>(TRK.OFS)<br>VR6<br>(FCS.OFS)<br>VR2<br>(RF.OFS) | Tracking error offset 45" OV±50 mV  Focus offset OV±50 mV  RF offset 100 mV±50 mV | <ul> <li>Set the unit to test mode (see page 29).</li> <li>Set VR5 TRK.BAL (tracking balance) to the position about 45° to the left of center.</li> <li>Adjust VR7 TRK.OFS (tracking offset) so that the TRK.ERR (tracking error) voltage at TP1 Pin 2 becomes 0V±50 mV.</li> <li>Adjust VR6 FCS.OFS (focus offset) so that the FCS.ERR (focus error) voltage at TP1 Pin 6 becomes 0V±50 mV.</li> <li>Adjust VR2 RF.OFS (RF offset) so that the RF output voltage at TP1 Pin 1 becomes 100 mV±50 mV.</li> <li>Note: When adjusting the tracking error offset, always perform "6. Tracking Balance Adjustment."</li> </ul> |
| 2  | RF leve            | l adjus              | tment  |   |   |   |
|  |                    |                      | TP1<br>Pin 1<br>(RF<br>OUTPUT)                                 | (Laser power)   | 1.5V+0.2V<br>-0V  | <ul> <li>Set the unit to test mode (see page 29).</li> <li>Play the test disc, connect the oscilloscope to TP1 Pin 1 (RF output), and measure the P-P voltage of the RF waveform.</li> <li>Check that the voltage is 1.5V +0.2V / -0V.</li> </ul>   |
| 3  | LD (las            | er diod              | e) power   | check   | -   |   |
| And the second s |                    |                      |  |   | Less than 0.13 mW   | <ul> <li>Set the unit to test mode (see page 29).</li> <li>Press the TRACK FWD (▷) key to turn ON the LD (laser diode).</li> <li>Place the sensor of the optical power meter directly above the objective lens and confirm that LD power is less than 0.13 mW.</li> </ul>   |
| 4  | Focus i            | ock an               | d spindle  | lock chec   | k   |   |
|  | 0.5V/div           | H<br>100<br>msec/div | TP1<br>Pin 1<br>(RF output)                                    |   | RF signal is output<br>Forward (clockwise)<br>rotation                            | oscilloscope. Confirm that the RF signal is output after the TRACK FWD (INCOM) key is pressed.  |





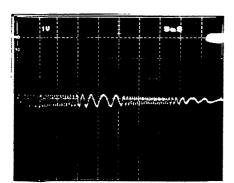


Photo 7-1 Null point

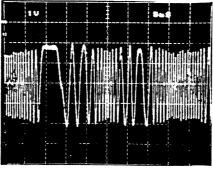


Photo 7-2 Maximum amplitude

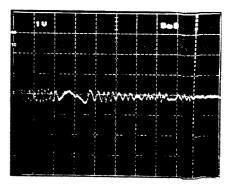
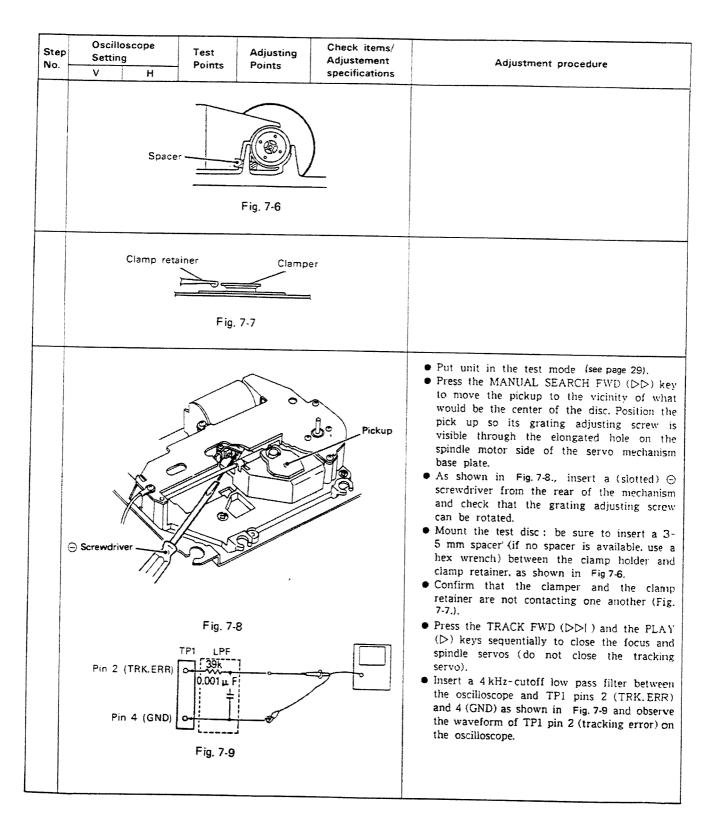
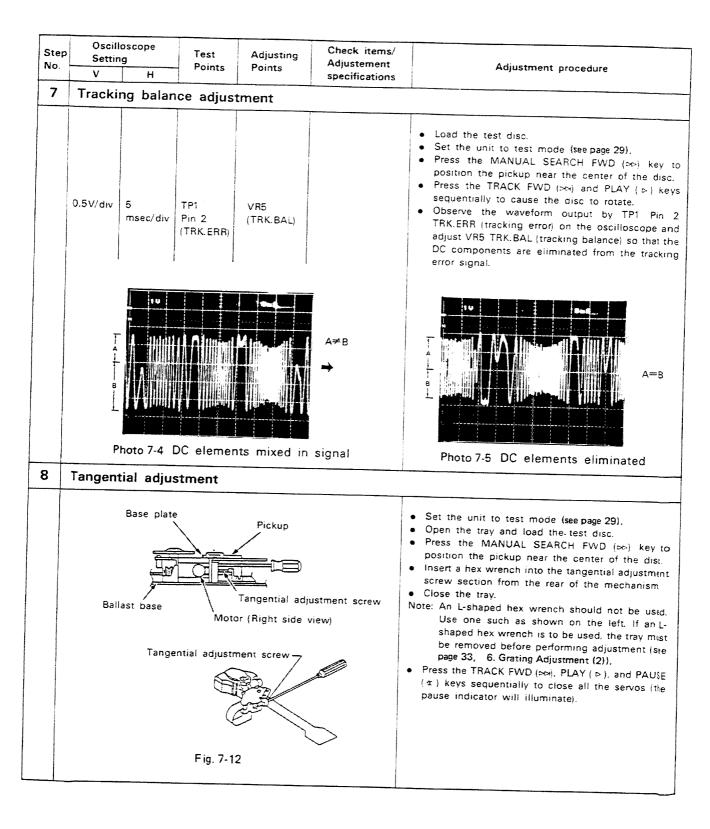


Photo 7-3 This is not the null-point wavefirm

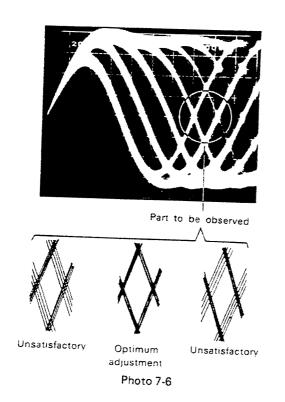


| Step   | Setting  |               |                           | Adjusting<br>Points  | Points Adjustement           | Adjustment procedure   |
|--|----------|---------------|---------------------------|--|------------------------------|--|
| No.  | V        | Н             | romis                     | 7 01.763   | specifications               |  |
|  | 0.5V/div | 5<br>msec/div | TP1<br>Pin 2<br>(TRK.ERR) | Grating<br>adjustment<br>screw<br>Grating<br>adjustment<br>screw | Null point<br>Max. amplitude | <ul> <li>Turn the grating adjustment screw with the screwdriver to find the null point (see Photo 7-1.).</li> <li>Next, slowly rotate the screw counterclockwise and adjust to the point where the waveform (tracking error signal) first achieves its maximum amplitude (see Photo 7-2.).</li> <li>Note: Avoid applying pressure to the screwdriver while adjusting the screw. Doing so causes the pickup to move inward, making adjustment more difficult.</li> <li>Lastly, remove the low pass filter and confirm that the tracking error signal p-p voltage does not greatly vary when the pickup is moved to the innermost and outer-most tracks of the disc. If the levels diverge by ±10%, or more re-adjust the maximum error amplitude point by rotating the grating adjustment screw.</li> </ul>   |
| Bearing Dase  Slide base  Fig. 7-10  Fig. 7-11 |          |               |                           |  |                              | <ul> <li>Remount the disc tray according to the following procedure when the grating adjustment is complete.</li> <li>1. Remove the disc and the spacer.</li> <li>2. While lifting the clamp holder [marked B in Fig. 7-5.] with the right hand, hold the tray in the left hand as indicated by C and slide the slide base into the hard resin fittings on the loading base as shown in Fig. 7-10, to reinsert the disc tray. (At this time, be sure to hold the φ4 steel ball in place with the index finger of the left hand.) (Also, be careful that the front panel is not damaged by the bearing of the slide base at the φ4 steel ball section coming into contact with the panel.) 3. Insert the slide base so that it fits into the two hard resin fittings at the rear of the loading base (see Fig. 7-11.). 4. Insert the tray all the way.</li> </ul> |





| Step | Oscillo<br>Settin | oscope<br>g     | Test<br>Points        | Adjusting<br>Points               | Check items/<br>Adjustement         | Adjustment procedure   |
|------|-------------------|-----------------|-----------------------|-----------------------------------|-------------------------------------|--|
| No.  | V                 | Н               | Fomis                 | r Omto                            | specifications                      |  |
|      |                   | 200<br>nsec/div | TP1 Pin 1 (RF output) | Tangential<br>adjustment<br>screw | Sharpest<br>possible<br>eye pattern | Observe the waveform output by TP1 Pin 1 (RF output) on the oscilloscope and adjust the tangential adjustment screw to achieve the sharpest possible eye pattern.  The point to which the adjusting screw should be set lies about halfway between the points where the eye pattern becomes most blurred when the screw is rotated clockwise and counterclockwise. When the whole waveform becomes clear, concentrate on sharpening the fine lines forming the diamond at the center of the eye pattern (see Photo 7-8.). Adjust until the fine lines on all four sides of the diamond are both sharply defined and dense.  Fig. 7-13  Note: Use a hex wrench to raise the pickup somewhat while making this adjustment. |



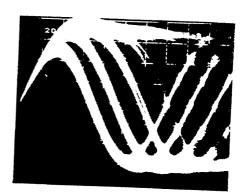


Photo 7-7

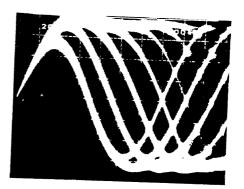


Photo 7-8

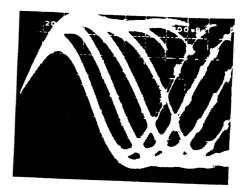


Photo 7-9



| Step<br>No. | Setting                                      | Points              | Adjusting<br>Points | Check items/<br>Adjustement | Adjustment procedure  |
|-------------|--|---------------------|---------------------|-----------------------------|---|
| 9           |  | 1                   |                     | specifications              |   |
| 8           | CH1(X), CH2<br>20mV/div 5mV<br>(probe: 10:1) | 1                   | VR3<br>(FCS. GAN)   | Phase<br>difference of 90°  | <ul> <li>With the oscillator power turned OFF, connect the oscilloscope and oscillator as shown in Fig 7-14.</li> <li>Set to normal play condition.</li> <li>Turn ON the power to the oscillator and set it to output a 1.2 kHz 1 Vp-p signal.</li> <li>Note: Some oscillators discharge a DC voltage when turned on. It is therefore recommended that the oscillator be connected after it has been turned on.</li> <li>Adjust VR3 FCS.GAN (focus gain) so that the Lissajous's figure-becomes a horizontal circle on the oscilloscope (phase difference of 90°).</li> <li>Pin 5 (FCS.IN)</li> <li>Pin 4 (GND)</li> <li>Pin 6 (FCS.ERR)</li> </ul> |
|             |  |                     |                     |                             | Fig. 7-14   |
|             | Gain overcon<br>Phot                         | npensated<br>o 7-10 |                     | Gain optimal<br>Photo 7-11  | Gain undercompensated Photo 7-12  |

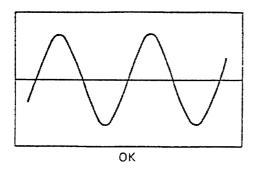
| Step<br>No. | Oscill<br>Settin<br>V | oscope<br>ig<br>H    | Test<br>Points | Adjusting<br>Points | Check items/<br>Adjustement<br>specifications | Adjustment procedure   |
|-------------|-----------------------|----------------------|----------------|---------------------|---|--|
| 10          | Tracki                | ng gain              | adjustme       | ent                 |   |  |
|             | CH1(X),               | CH2(Y),              | X-axis         | VR4                 | Phase   | <ul> <li>With the oscillator power turned OFF, connect the oscilloscope and oscillator as shown in Fig 7-15.</li> <li>Set to normal play condition.</li> <li>Turn ON the power to the oscillator and set it to output a 1.2 kHz 2 Vp-p signal.</li> <li>Note: Some oscillators discharge a DC voltage when turned on. It is therefore recommended that the oscillator be connected after it has been turned on.</li> </ul> |
|             |                       | 20mV/div             |                | (TRK.GAN)           | difference of 90°                             | <ul> <li>Adjust VR4 TRK.GAN (tracking gain) so that the Lissajous's figure becomes a horizontal circle on the oscilloscope (phase difference of 90°).</li> <li>Pin 3 TP1 100 kΩ (10:1)</li> <li>Pin 4 (GND)</li> <li>Pin 2 (TRK.ERR)</li> <li>Pin 2 (TRK.ERR)</li> <li>Pin 3 (10:1)</li> </ul>   |
|             |                       |                      |                |                     |   | 777<br>Fig. 7-15   |
|             |                       |                      |                |                     |   |  |
|             |                       | rcompen<br>hoto 7-13 | sated          |                     | Gain optimal<br>Photo 7-14                    | Gain undercompensated Photo 7-15   |



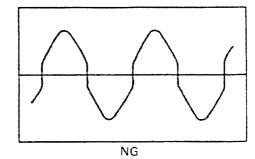
| Step<br>No. | Oscilloscope<br>Setting |          | Test<br>Points         | Adjustament      | Adjustment procedure       |   |
|-------------|-------------------------|----------|------------------------|------------------|----------------------------|---|
| 140.        | V                       | Н        | Points                 | Foints           | specifications             | rejustitoit procedure   |
| 11          | vco                     | free run | frequency              | , adjustme       | nt                         |   |
|             |                         |          | TP2 Pin 2              | VR8<br>(VCO.ADJ) | <b>4.275</b><br>±0.025 мнг | <ul> <li>Set the unit to test mode (see page 29).</li> <li>Short the ASY and GND jumper with a screwdriver or similar tool (see Fig. 7-1.).</li> <li>Connect a frequency counter capable of measuring frequencies of 10 MHz and above to TP2 Pin 2.</li> <li>Adjust VR8 VCO.ADJ (VCO free run adjustment) so that the frequency counter reading becomes 4.275±0.025 MHz.</li> </ul> |
| 12          | Focus                   | error ch | eck                    |                  |                            |   |
|             |                         |          | TP1 Pin 6<br>(FCS.ERR) |                  |                            | <ul> <li>Set the unit to test mode (see page 29).</li> <li>Ground TP1 Pin 5 FCS.IN (focus in) to GND.</li> <li>Observe the waveform output by TP1 Pin 6 FCS.ERR (focus error) when the TRACK FWD (▷) key is pressed.</li> </ul>   |

| Step<br>No. | Oscilloscope<br>Setting |                 | Test<br>Points   | Adjusting<br>Points | Check items/<br>Adjustement | Adjustment procedure   |  |
|-------------|-------------------------|-----------------|--|---------------------|-----------------------------|--|--|
|             | V                       | Н               | romts  | FUIILS              | specifications              |  |  |
|             | MSB adjustment          |                 |  |                     |                             |  |  |
|             | 5mV/div                 | 0.2<br>msec/div | JA1 LINE OUT terminal (Lch)  JA1 LINE OUT terminal (Rch) | VR10<br>VR9         | Sine wave<br>Sine wave      | <ul> <li>Set the unit to normal play mode. (see page 29).</li> <li>Play back the 20th track (-60 dB, 1 kHz, L/Rch) of the test disc (YEDS-7).</li> <li>Connect an oscilloscope to L ch of the LINE OUT terminals and observe the audio output waveform.</li> <li>Adjust VR10 MSB.ADJ Lch (MSB adjust, right channel) so that the waveform on the oscilloscope becomes a sine wave.</li> <li>Perform the same adjustment for R-CH (VR9).</li> </ul> |  |

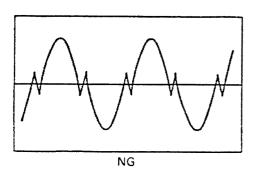
# • Zero cross distortion waveform













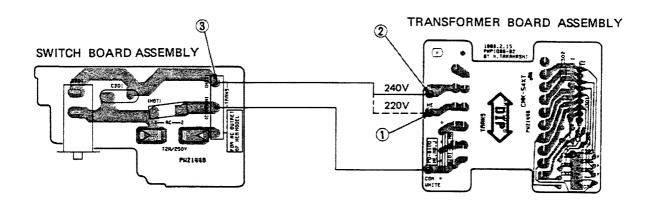
#### Line Voltage Selection (for HEM and HB types)

- Line voltage can be changed with the following steps.
- 1. Disconnect the AC power cord.
- 2. Remove the bonnet case.
- 3. Change the connection wire from Switch board assembly (Terminal NO. 3) to Transformer board assembly (Terminal NO. 1) or 2) as follows.

| Voltage | Terminal NO. of Transformer board assembly |
|---------|--|
| 220V    | ①  |
| 240V    | 2  |

4. Stick the line voltage label on the rear panel.

| Part NO. | Description |
|----------|-------------|
| AAX-193  | 220V label  |
| AAX-192  | 240V label  |





# 8. FOR HB TYPE

#### 8.1 CONTRAST OF MISCELLANEOUS PARTS

#### NOTES:

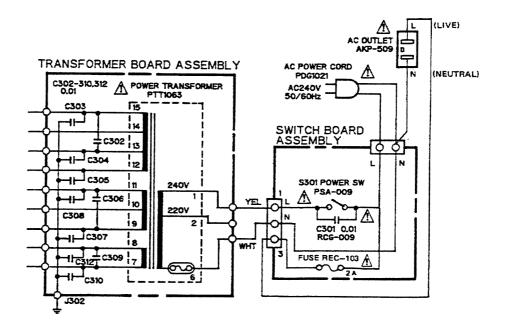
- Parts without part number cannot be supplied.
- The 
   \( \triangle \) mark found on some component parts indicates the importance of the safety
  factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "©" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

The PD-X550/HB type is the same as the PD-X550/HEM type with the exception of the following sections.

| Mark     | Symbol & Description   | Part        |            |         |
|----------|--|-------------|------------|---------|
| 17703 10 | Cymbol & Description   | PD-X550/HEM | PD-X550/HB | Remarks |
| A        | 1P AC outlet   | AKP-508     | AKP-509    |         |
| ΔŶ       | AC power cord  | PDG1008     | PDG1021    |         |
|          | Operating instructions (English)   | •••         | PRB1094    |         |
|          | Operating instructions (English/French/Spanish/German/ Italian/Swedish/Dutch/Portuguese) | PRE1094     |            |         |

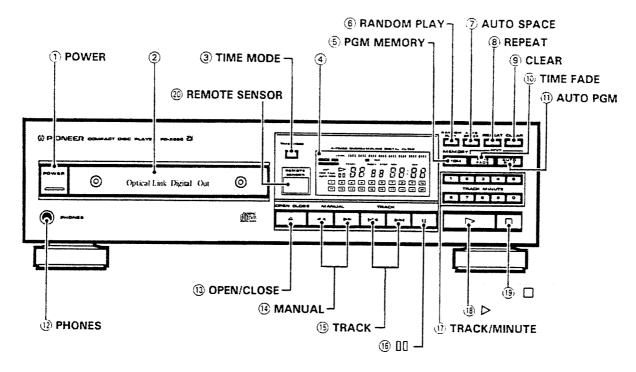
#### 8.2 SCHEMATIC DIAGRAM

# • For HB type



# 9. PANEL FACILITIES

#### FRONT PANEL



#### 1 POWER switch

Press to turn power to the unit ON and OFF.

#### (2) Disc tray

This is where the disc is set. When power is switched ON and the OPEN/CLOSE key is pressed, the tray is ejected forward. To insert the tray, press the OPEN/CLOSE key, or lightly push the tray in with your finger. With the disc tray open, pressing the play key will close the disc tray and start playback.

#### ③ TIME MODE key

This key selects the display mode of the indicator panel. Each time the key is pressed, the indication changes from TIME, REM, to TOTAL in that order. (For details concerning the display contents, refer to the explanation about the indicators.)

If pressed after pressing the track number key, the playback time of the selected track only is displayed.

#### (4) Indicators

LEVEL : The volume level of fade-out is displayed.

PGM : Lights after programming (after program has

been memorized).

RND Lights during random playback.

AUTO SPACE: Lights during auto space playback.

- REP : Lights during repeat playback of one track.

: Lights during repeat playback. D (PLAY) : Light during playback.

(PAUSE) : Light during temporarily interrupt playback.

TRACK 1 - 20 (Music calendar)

: Displays the current track number (during normal playback and programmed playback) or the track being programmed during programming operation. The lower figures light up in accordance with the number of tracks recorded on the disc, and the numbers of the tracks which have been played are deleted in order. (During programmed playback only the pro-

grammed tracks light.)

INDEX : Displays the index \* number of the music sec-

tion of a track or the track division.

Displays the program steps.

MIN (minute): Displays the minutes of the elapsed time, total playback time, and remaining time.

SEC (second): Displays the seconds of the elapsed time, total

playback time, and remaining time.

#### TIME/REM/TOTAL

: Changes each time the TIME MODE key is

pressed.

TIME : Displays the track number of the track being

played (TRACK) and the elapsed time

(minutes and seconds).

RFM : Displays the remaining time on the tack be-

ing played.

When the TIME MODE key is pressed again, the remaining time on the disc will be dis-

played.

• TOTAL : Displays the total number of tracks on he disc

(TRACK) and the overall playback time

(minutes and seconds).

During playback, the display goes on for a bout 5 seconds before changing to the TIME

display.

Programmed playback operation displays the rehalt ning time of the programmed tracks (REMAIN), and the stotal playback time (TOTAL).

#### TIME FADE EDIT

: Displays when Time Fade Editing isset or used.



#### AUTO PGM EDIT

: Displays when Auto Program Editing is set or used.

 The INDEX is a signal which is recorded within a track to indicate division of the track into separate tunes and items of music.

# **5** PGM MEMORY key

Use to program a sequence of tracks.

#### **6** RANDOM PLAY key

Press to begin random playback.

#### 7 AUTO SPACE key

During playback, there will be a pause of about three seconds before the next track is played.

#### **8** REPEAT key

Press this key for repeat playback. Pressing the key once, twice, or three times will change the repeat mode from single track repeat, all tracks repeat, and repeat playback cancellation.

#### GLEAR key

Press this key to clear the program.

# 10 TIME FADE key

Press this key to end playback at a desired time with fade-out.

#### 1 AUTO PGM key

Press to program a tune which may be played back within a specified time.

# 12 PHONES (headphones) jack

When you wish to use headphones, insert the plug for the headphones into the headphone jack.

# ③ OPEN/CLOSE key ( ♠)

Press when you wish to eject or load a disc. Each time the key is pressed, the tray is alternately pushed out or pulled in.

# (i) MANUAL search keys (◄◄, ▶►)

When the player is in playback or pause modes, these keys are pressed to perform fast forward or reverse operations to allow manual searching. These operations are only carried out during the time either key is pressed.

# (15) TRACK search keys (⋈, ⋈)

During normal playback, programmed playback or pause modes, these keys are pressed to search for the desired track. Pressing either key causes the player to advance to the next track or to return to the previous track. Even in stop mode, these keys can be used to select the desired track. Press the PLAY key to playback the desired track.

# (16) Pause key (1111)

Press to temporarily interrupt playback. When pressed again, the pause mode is cancelled and playback resumes.

# ① TRACK/MINUTE keys (1 to 0)

- Use to specify track numbers (track 1 track 99) for selection of tracks or program entry.
- Use to specify time (in minutes), during auto program editing and time fade editing.

# <sup>®</sup> Play key (▷)

Press to begin playback, and to cancel the pause mode.

# <sup>19</sup> Stop key (□)

Press to stop playback. When pressed, the player goes into stop mode and all operations stop.

#### **② REMOTE SENSOR**



# 10. SPECIFICATIONS

#### 1. General

| Type Compact disc digital audio system Power requirements |
|---|
| European models AC 220 V, 50/60 Hz                        |
| U.K., Australian models AC 240 V, 50/60 Hz                |
| U.S., Canadian models AC 120 V, 60 Hz                     |
| Other models AC 110/120-127/220/240 V                     |
| (switchable), 50/60 Hz                                    |
| Power consumption 16 W                                    |
| Operating temperature +5° C-+35 °C                        |
| (+41 °F-+95 °F)   |
| Weight 3.9kg (8lb, 10oz)                                  |
| External dimensions                                       |
| $14-3/16(W) \times 13-3/16(D) \times 3-7/8(H)$ in.        |

# 2. Audio section

| Frequency response        | 4 Hz-20 kHz (±0.5 dB) (EIAJ)    |
|---------------------------|---------------------------------|
| S/N                       |                                 |
| Dynamic range             | 95 dB or more (EIAJ)            |
| Channel separation        | 96 dB or more (EIAJ)            |
| Total harmonic distortion | 0.004% or less (EIAJ)           |
| Output voltage            | 2.0 V                           |
| Wow and flutter           | Limit of measurement            |
|                           | (±0.001% W.PEAK) or less (EIAJ) |
| Number of channels        | 2 channels (stereo)             |

#### 3. Output terminal

Optical digital output terminal Audio line output terminal Headphone jack

#### 4. Functions

- Play
- Pause
- Manual search
- Track search
- Direct track search
- One track repeat
- All track repeat
- Random play repeat
- Programmed repeat
- Programmed playback
- Pause program
- Add-on program
- Auto program editing
- Time fade editing
- Timer start
- Random play
- Auto space

#### 5. Accessories

#### NOTE

The specifications and design of this product are subject to change without notice, due to improvements.